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A compilation of reports of four committees of the Twenty-Nine College Cooperative Plan, a group of Northeastern liberal arts colleges and universities which joined together in 1952 for the purpose of encouraging students to undertake teaching careers. The member institutions, generally without professional schools of education, maintain close contact with fifth-year graduate training programs, especially the master of arts in teaching program, and similar plans for prospective elementary school teachers.

In the reports, the committees addressed themselves primarily to the question: What should be the course of study for a prospective secondary school teacher in order best to prepare himself in his discipline, assuming 4 years of undergraduate work and a fifth graduate year of training? Four subject areas were studied: (1) language and literature, (2) mathematics, (3) natural sciences (with specific recommendations for preparation in earth sciences, physical sciences, chemistry, and biology), and (4) history and the social sciences.

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Submitted by - Mr. Paul Perry
94 Prescott St
Cambridge 38 Mass

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THE ACADEMIC PREPARATION OF SECONDARY SCHOOL TEACHERS

U. S. DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Office of Education

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The Reports of Four Committees of the Twenty-nine College Cooperative Plan

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THE ACADEMIC PREPARATION OF SECONDARY SCHOOL TEACHERS

The Reports of Four Committees of the
Twenty-nine College Cooperative Plan

December, 1962

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INTRODUCTION

THESE four reports have the aim of offering to prospective secondary school teachers a guide to appropriate preparation in the subjects they are planning to teach. The four committees which drafted the documents suggest, rather than prescribe, and while they make no claims exhaustively to have studied their topics, they hope their efforts will serve for the present to offer guidance to students who are considering careers in teaching and to colleges which wish to provide sound undergraduate academic preparation for future teachers.

The authors of these reports are professors at member colleges of the Twenty-nine College Cooperative Plan, a group of northeastern liberal arts colleges and universities which joined together in 1952 for the purpose of encouraging students into careers in teaching, particularly in elementary and secondary schools.* Representing principally four-year liberal arts colleges without professional schools of Education, the Plan has retained close contact with a variety of fifth-year graduate training programs, especially Master of Arts in Teaching programs and similar plans for prospective elementary school teachers. The Plan, which originated through the initiative of various members of the Harvard faculty, has been closely allied with the fifth-year programs at Cambridge, and representatives meet annually at Harvard to discuss problems and decide policy. At the 1961 meeting of this group the suggestion to draft the following reports was made. Undergraduates interested in secondary school teaching had continually asked their advisers in the colleges to suggest relevant programs of preparation. The college representatives therefore decided that a published guide available to students would be desirable. The question faced by the four committees appointed by the representatives was simply this: in your judgment, what should be the course of study for a prospective secondary school teacher

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* The members, now totalling thirty, are: Amherst, Barnard, Bates, Bennington, Bowdoin, Brandeis, Brown, Bryn Mawr, Colby, Colgate, Connecticut College, Dartmouth, Hamilton, Harvard, Haverford, Holy Cross, Lafayette, Massachusetts Institute of Technology, Middlebury, Mount Holyoke, Pembroke, Radcliffe, Sarah Lawrence, Simmons, Smith, Swarthmore, Vassar, Wellesley, Wheaton, and Williams. It should be noted that the reports that follow are endorsed by the individuals representing these colleges, not the college governing boards as a whole.

in order best to prepare himself in his discipline, if one assumes four years of undergraduate work and a fifth, graduate year of training? The four committees each met several times during 1961 and 1962; their findings were discussed by a general meeting of college representatives and committee members at Cambridge in January, 1962. Revisions were then made, and a final draft was prepared in the spring of the same year.

A number of cautions should be entered at the start. By suggesting studies for prospective teachers which are organized in a five-year sequence, the members of the Plan are *not* necessarily endorsing the general notion that all teachers need as much (or as little) as five years of preparation. They are suggesting studies within a five-year framework because this is a common one, if not the only one, that is reasonable and realistic for their particular students, organized as their several colleges are. Members agree that they have no particular brief for the Master of Arts in Teaching programs or for any others, and that, with the lack of evidence of any "best" way of preparing teachers, they favor a variety of entrees into teaching.

Another caution is that these committees are *not* designing programs for college "majors." They are, rather, stating minimal goals in as general language as possible. They feel that students and their colleges need variety for vigor, and that a too strict program might be stultifying.

Most important is the caution that the contents of these reports are tentative. The committees were made up of distinguished men and women; the reports are the opinions of these scholars, debated and refined. But in no way were the activities of the committees full-scale investigations, and in no way do they wish their suggestions to be considered the be-all and the end-all of teacher preparation. As the various footnoted objections within the reports show, there were differences of opinion; these were recorded, not resolved. The lack of appendices, statistical summaries, and the solicited opinions of high school teachers is evidence of the limited and tentative nature of these reports. The four documents represent the best current advice from experienced college teachers who are deeply concerned with their responsibility to prepare secondary school teachers.

Cautious though the members of the Twenty-nine College group may be, they were emphatic at their meetings on several common points. All four committees underscored the essential requirement of a liberal education. A clear definition of this now hackneyed phrase did not emerge from these documents any more than it has from the pens of other proponents, but the committees' intent was clear. All prospective teachers should have some acquaintance with all of the central academic disciplines and the start on a profound understanding of one or more. All should be sensitive both to the rigor of statistical analysis and to the intuition of artistic appreciation. All should have the basic skills of computation and expression. All should have

been vigorously exposed to the process of logical thought and critical insight. The committees were emphatic that the *sine qua non* of all liberal education, particularly for teachers, is the ability to communicate orally and in writing. The most valuable abstract scientific finding, it was argued, is useless without its discoverer's ability to inform others of it. And at the same time it was urged that mathematics provide for the liberally educated its particular tool of analysis and communication in a form useful to society. The strong feelings of the committees on these points leave an obvious message for the liberal arts college *in toto* and not just to that portion of its students who are preparing to teach in the secondary schools.

No less important was the form in which the four committees were organized. There were not separate committees for English, the modern foreign languages, and the classics; all, rather, were joined in a single Committee on Language and Literature. While the various languages receive their due in the report, the point is clear that the problems of language and written expression are common ones across subjects now quite arbitrarily divided in American colleges and secondary schools. The word "grammar" is notable by its absence: language is conceived, by the committee, to be formal grammar and much more, a larger field that the competent teacher must grasp. The Committee on the Social Studies restyled itself History and the Social Sciences; its point was not to debate what a "science" or "social science" was but rather to affirm that *both* history and the social sciences are required in the training of a secondary school social studies teacher. Its report and the minority views appended to it are provocative in this regard. The Committee on the Natural Sciences faced a similar problem of definition since the strands of chemistry, biology, physics, and the earth sciences, with their essential unity and overlap as well as their very real specialization, are as complex as the overlaps of history, sociology, economics, and psychology.

Serious omissions, of course, are the lack of reports on art and music. The members of the Twenty-nine Colleges decided in 1961 to prepare reports only for those fields in which the overwhelming majority of their students wish to teach, but they are aware of the implications of their neglect of the arts and music. Stepchildren these subjects are in many American secondary schools, and stepchildren, the members agree, they should no longer be. Reports from committees in these fields may be prepared in later years; their absence from this present volume is not meant to imply disinterest or neglect.

What should be taught to teachers in order that they may teach children? This question, which is essentially the one dealt with by the four committees, really puts the cart before the horse: until one has decided what the children are to learn, how can one prescribe the content of teachers' preparation? This nagging question plagued all the committees as will be immediately evident: each group had to find a balance between suggestions for training

for present school curricula and training for some ideal, theoretical school. Prescribe training to provide teachers for the *status quo*, and one implies unintentionally that the *status quo* is satisfactory or even desirable. Prescribe training for some ideal school, and one prescribes unrealistically and less usefully for our college students. Furthermore, decisions on the curriculum of the ideal school would take far more basic work than the assembled committees of the Twenty-nine Colleges were able to afford. Accordingly the four reports are in the form of a self-conscious and often unhappy compromise. Each committee tried not to stand pat on the *status quo*, but at the same time attempted to be realistic. The results are hardly perfect in their authors' eyes, *but provide, in their view, constructive, if temporary and tentative,* advice to the teachers of two or three years hence, persons now undergraduates in the cooperating colleges. The results are *not* construed to be blueprints in vague form of ideal curricula for the secondary schools.

Another problem faced by the committee members was the disorder in the structure of their various disciplines and the confusion this leaves in both secondary school and college curricula. Not only has the volume of accumulated knowledge increased, but the neat disciplinary forms in which it has been packaged are breaking down. When is physics physics and not chemistry? Where does sociology stop and history start, and where does literature overlap the latter? Suggesting realistic courses of study in the existing departments of the Twenty-nine Colleges was as difficult a venture for the committees as identifying realistic secondary school curricula for which to prepare.

With these foregoing cautions and emphases in mind, then, are the reports to be read. That they prove useful for undergraduates and their colleges is their authors' hope.

December, 1962

THEODORE R. SIZER
Director, Master of Arts in Teaching Program
Harvard University

LANGUAGE AND LITERATURE

I. Some Preliminary Considerations

In order roughly to define the mandate of this committee, it is necessary first to observe that, particularly in English (the largest of the disciplines under consideration), high school teachers are drawn from institutions and programs of several different kinds. Many high school teachers of English, especially in the East, are graduated from liberal arts colleges that make no provisions for courses in pedagogy: in order to obtain certification, these graduates must spend a year in a School of Education. A larger number of teachers, particularly in the Mid- and Far West, are graduated from teachers' colleges or state universities with credit for many courses in pedagogy. (At Ohio State University, for example, all English majors planning to teach in secondary school must enroll in the School of Education.) A third group, of uncertain but increasing size, is composed of those who have had strong liberal arts training in college together with a minimal program in pedagogy (say, two or three semesters) and some practice teaching. This committee, it is clear, can concern itself only with the first and third of these groups: we address ourselves to the training of undergraduates in liberal arts colleges that may or may not offer a few courses in Education. We must accordingly assume that most students with whom we are concerned will have at least one year of post-graduate study before they begin to teach. Some of our recommendations, therefore, can be distributed over a five-year period if necessary; some of them (see "Language," below) may have to be so distributed.

This committee, in the course of its very limited deliberations, found itself more than once discussing two peripheral but important questions that arise from the situation of the liberal arts undergraduate who goes into high school teaching. The committee has neither the information required to suggest even a tentative resolution of each problem nor the time to get such information. But we believe that the questions should be posed for general, long-range consideration.

1. To what extent do honors and major programs of the liberal arts colleges so distinguish between the superior and the average student as to imply that a career in secondary school teaching is appropriate only for the second-best? Is it true that honor candidates, whether in English or a foreign language, are customarily encouraged by training and example to go on to the Ph.D. rather than the MAT (Master of Arts in Teaching)? Does the pre-professional

training of some honors and major programs discriminate in favor of those, especially men, whose capacities are more relevant to the scholarship and teaching of the college than of the high school? What kinds of careers do they encourage? What discriminations among students do they make?

2. To what extent, on the other hand, is it proper or necessary to warn the woman undergraduate who wants a career in education that her chances for employment and advancement may be greatest in secondary school or junior-college teaching? Is this a problem too large—too entangled with social and economic considerations—for any academic advisory group to face? Worse, is it a problem that can only be exaggerated by public discussion?

In brief, the educational practices of some of our colleges and universities seem to encourage the promising young man to turn away from a career in high school teaching; the staffing practices of those same colleges and universities seem to discourage the promising young woman from turning to any teaching career except that in the secondary school: to put our two problems in this form is doubtless to oversimplify. But the simplification may emphasize certain features of the situation before us that qualify any confidence we may feel in the power of curricular standards and reform.

II. English Language and Literature

Because it involves the largest number of teachers and students, we consider first and by itself undergraduate training of the future high school teacher of English.

A. *Language*

The high school teacher of English must spend a great deal of time introducing pupils to and instructing them in the language they already "know"; we therefore believe that the preparation of this teacher should include some study of the history and the structure of the English language. We are encouraged in this recommendation by recent and continuing developments in the study of linguistics. These developments, indeed, may lead to the day when all undergraduate students of language and literature may be enrolled in a general course in the structure of language from which they will severally move into courses in the history of the languages in which they are majoring—French, Russian, English, or any other. Such a course cannot arrive on any campus tomorrow, and it will be many years before most colleges can add experts in modern linguistics to their faculties. We recognize, too, the painfulness of yet one more requirement in an undergraduate curriculum, for we know well that our future high school teachers need all the time they can get to read widely and deeply in the literature they will present. It seems reasonable to us, however, that at least within the assumed five years of training

(undergraduate and one year of graduate study), the future high school English teacher should be informed of the history and structure of the English language.

B. *Composition*

Although the high school English teacher has always been as much concerned with his student's writing as he knew how to be, the recent furor about the subject suggests that he may have to be even more deeply concerned with it in the future. It does seem clear that whether or not they must ask for more writing from their pupils, most high school teachers do not know enough about the practice of writing. It seems true, furthermore, that a good many high school teachers have had no formal training in rhetoric or general principles of composition since their freshman year in college and sometimes not since high school. The undergraduate training of the future high school English teacher must therefore include as much practice and study of composition as the curriculum can support.

To assist this general aim, we believe that all undergraduate courses in English should be strongly fortified with writing. Exactly how much formal instruction in rhetoric should be required will of course depend upon the practice of individual departments of English. Mere learning of "rules" or the arid application of "patterns" can of course do little to prepare a teacher to give effective help to puzzled, clumsy, inarticulate high school students. On the other hand, one of the most pressing problems of the English teacher is where to learn the convention of usage and what attitude to take toward those conventions. Some training in formal rhetoric (together with the historical study of English) will assist the teacher to mediate with firmness and confidence between the increasingly widespread belief that usage is as mutable as the stock market and the belief that what is "correct" can be found only in certain models of the past. Above all, the undergraduate prospective teacher should establish for himself an awareness of the relation between his experience and his language. The more disciplined, criticized writing he can do, the sharper will be his sense of this critical relation. He must have passed through the discipline to which he will ask his students to submit.

C. *Literature*

Most high school graduates do not want to read, do not enjoy reading, and, in short, simply do not read. Everyone can offer a set of large and important reasons for this unhappy situation, but it is possible to suggest some corrective measures within the undergraduate major program itself. Let it be said at the outset that the study of literature is, and should be, exacting. We wish to suggest that the goal of easy mastery of literature may be too common among

high school teachers of literature: such a goal (many textbooks openly flaunt it) breeds contempt for books and, of course, breeds also an all-too-willing obliviousness of texts that cannot be easily mastered. Again, the notion that a work of literature can be "solved" like a cryptogram is as misleading and as stultifying as the older notion (which it has largely displaced) that the way to understand a work of literature is to find in it a moral or learn something about its author's life. This committee agrees that the undergraduate training of the future teacher should be as various as the enormously varied subject before him. The English major should be a compound of period courses, genre courses, single-figure courses. But every course must be shaped by the most relevant approach to the works it puts before its students. These students must be shown how to isolate a work so that they may meet it as fully and as openly as possible. Some works must be explained by and disengaged from special and detailed historical backgrounds. Others must be explained by and disengaged from special techniques of analysis—for example the sorting out of patterns of metaphor. Still others must be explained by and disengaged from detailed biographical information. And still others, especially many major works, must be approached by a combination of these methods. The undergraduate student of literature must experience throughout his training *both* the enormous variety *and* the traditional continuities that make his subject central in all our humanistic values. The experience of this combination cannot come about by moral exhortation alone: frequent short and incisive papers should accompany every course in the literature curriculum. Such training may not perfectly equip the future teacher to be satisfied with the material he must present, say, to pupils of the ninth grade but, even there, it should assist him to encourage in his pupils those habits of reading and attention that will keep them from sliding off the stories and other works before them into reverie or something vague called "background." We also believe that the future English teacher should know at least one foreign language well enough to teach with some awareness of idiom, etc., the translation of a work from that language.

III. Foreign Language and Literature

There is of course no need to urge a stronger position for the study of language and the practice of composition (certainly at least of oral composition) in the undergraduate foreign language programs. Some achievements here, in fact, have given fresh insights and techniques to the study of English. College teachers of foreign languages, moreover, are agreed that the main emphasis of the literature courses should be not on coverage but on variety of matter and on critical approach. The so-called "century" courses may not be, as their titles suggest, a survey of all the major and minor writers; they may in fact combine genre and period simply by emphasizing for each century the most vigorous genre in it (e.g., the drama in 17th-century France). The introductory course is likely to be a survey in the conventional sense, but it must be

remembered that most foreign-language departments are not large enough to offer a full range of courses each year, and the survey is the only practical way in which to give a student a sense of the span of the literature he is studying and to prepare him to enter any of the less extensive courses that can be open to him in any later year.

In general the committee believes that any foreign-language major must involve a study of literature texts. The committee also suggests that certain recent innovations in high school curricular organization strongly indicate that in the future foreign-language teachers may be called on to teach in translation those texts in the high school English (or "Humanities") courses that were originally not written in English. It is hoped that all teachers will make sure, when teaching a translation, to let their students know that the work before them *is* a translation and, it may be, not always the most perfect translation conceivable.

The study of Greek and Latin in college entails few survey courses; nearly all courses concentrate on a single figure (Ovid, Cicero, et al.). Moreover, the period in which archeology and philology were the principal concerns of teachers of the classics is probably past: historical considerations of the text are now more likely to be subordinated to literary considerations. The committee believes that the college classics major ought to provide the future teacher with a strong sense of the varieties of material that could be used in introducing students to Latin, including medieval texts and paying special attention to lyric poetry and narrative prose. In many high school Latin programs pupils still pursue a course of study (Cicero and Vergil) that lacks such variety: it is as if 9th and 10th grade English classes were to limit themselves to a study of Burke's speeches and *Paradise Lost*. The aim of the student of classics, we believe, should be to meet Greek and Latin literature directly, freely, and with enjoyment—and without relying on side effects for justification (e.g. "mental discipline," "assistance to the study of English," etc.).

IV. Some Minimum Recommendations

As a *minimum* requirement the prospective high school teacher of English should have taken courses[1] involving the following (the study of these subjects being, if necessary, completed in a fifth year):

Prose Fiction.
Intensive Reading of Poetry.
Advanced Composition.

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[1] For the sake of clarity, all committees have used the term "year course" to mean a full year's work in a subject, whether the particular college is on a semester or quarter system. Accordingly, "half-year course" and "quarter-year course" have meaning in this light. Presumably a student would carry four or five "year courses" a year.

The Structure and History of Language.
The Works of Shakespeare.
The Major Figures of American Literature.
Sufficient knowledge of a second language to allow the judging of a translation.
Sufficient knowledge of history and the social sciences so that the prospective teacher of English could also teach some courses in Social Studies.

For the prospective teacher of Foreign Languages:

Proficiency in the spoken language. The prospective teacher should have fluency and authority in class.
Solid grounding in major periods of foreign literature (e.g. classical drama in French, the age of Goethe in German, the era of Cervantes in Spanish).
Training in composition.
Sufficient background in the history and culture of the country to provide a context for literature.
A year of study abroad is a welcome enrichment of any undergraduate preparation in a language major. While it does not constitute a requirement, it does enable the prospective teacher to acquire skills and knowledge not ordinarily obtainable through academic formation on this continent. A few summer schools, such as Middlebury, may offer some degree of equivalent experience.

For the prospective teacher of Classics (primarily Latin):

Training in Composition.
Familiarity with the literature and thought of the First Century, B.C. and the Augustan Age.
Enough reading in history and culture, including archeology, to provide a context for literature.

The committee is aware that its discussion of English is both more comprehensive and more specific than its discussion of foreign languages. The fact is that the largest problem in the high schools now and for the future is, we believe, the study of English in all its branches.

George Becker, Swarthmore College
Konrad Bieber, Connecticut College
G. Armour Craig, Amherst College
W. Nelson Francis, Brown University
Harold C. Martin, Harvard University
Elizabeth Nye Quinn, Mt. Holyoke College
Wylie Sypher, Simmons College

MATHEMATICS

In this report, we shall be concerned mainly with the problem of training mathematics teachers for high schools. We should like to speak first, however, on two matters which are not strictly within our mandate.

We wish to underscore the point that every teacher should have a liberal education. It is easy for this idea to be missed, when representatives of various fields argue (as of course they should argue) for thorough study of the prospective teacher's specialty. For a number of reasons, however, we believe that the case for broad liberal education is especially strong when the student intends to be a teacher.

In the first place, teachers exert both a personal and an intellectual influence on their students. Thus the teacher's cast of mind tends, for better or worse, to propagate itself. If a mathematics teacher feels for literature an indifference or antagonism born of ignorance, this may be conveyed to the student. The same applies to an English teacher who feels the same way about mathematics or science.

In the second place, if the faculty of a school is to cooperate as a group, then it should not be an uneasy coalition of technical specialists; most of its members should have a sympathetic understanding of the work of the school as a whole; and this is more likely to come from substantive education than from abstract preachment.

Finally, it is a fact that the leaders in the school world are drawn mainly from the classroom. It hardly seems practical for them to get the broad educations that they need, late in their careers, on a remedial basis.

These remarks apply with special force to prospective elementary teachers, who seem to be expected to know everything. If there is a major gap in the teacher's training, the students suffer for it. Poor and insufficient mathematical training seems to be especially prevalent. An excessive number of elementary teachers are so ignorant of mathematics that they regard it with an antagonism due to fear. The present college mathematics curricula are not an ideal solution of this problem; work is now being done on the design of more appropriate courses. Meanwhile, however, as a minimum, prospective elementary teachers should be urged to study enough mathematics in college to solidify their basic skills and to realize that mathematics is a science—even an art—and certainly more than a mere clerical chore. If an undergraduate program

includes little or no mathematics, the resulting gap is much too big to be filled in a Master of Arts in Teaching program. The study of mathematics takes time. And it is surely worth the time of an elementary teacher, because it forms about a fourth or a fifth of her job. In many cases it is not practical for a liberal arts college to offer special courses for prospective elementary teachers. Standard courses, however, if the student actually studies them, will free the special graduate courses from the impossible remedial task which they now face.

Our recommendations for prospective high school teachers are only slightly different from the usual undergraduate major. We recommend merely certain shifts of emphasis. We believe that the main objective is to produce a really thorough understanding of the sort of mathematics that is taught—and is coming to be taught—in the high schools themselves. The order of presentation varies, and there are some innovations now widely used. But the following is a fair, rough outline:

Ninth grade. Introduction to algebra.
Tenth grade. Geometry.
Eleventh grade. Algebra, trigonometry, analytic geometry.
Twelfth grade. Some of the following: Trigonometry, solid geometry, probability theory, abstract algebra, analytic geometry and calculus.

As basic undergraduate preparation for the teacher we recommend the following:

(1) A three-semester sequence in analytic geometry and calculus.
(2) Two semesters in abstract algebra.
(3) Two semesters (total) of probability and statistics.
(4) Two semesters of geometry, beyond the analytic geometry already mentioned.
(5) Two semesters of elective courses.

These courses have been selected with due attention both to mathematics considered as a science in itself and to the mathematical needs of the natural and the social sciences. All of them (except perhaps the last) are recommended as direct contributions to the mastery of the high school curriculum.

(1) Analytic geometry and calculus is fundamental in any case. It applies to almost any program in the eleventh and twelfth grades.

(2) Study of abstract algebra is obviously a preparation for teaching more elementary forms of the same subject-matter in the twelfth grade. It applies in a less obvious way to the work of the ninth grade. Here the point is that while many elementary algebra courses aim to produce skills on a largely behavioral level, most of the new ones attempt more logical treatments, and these call for a sort of understanding, on the part of the teacher, that is best

acquired in a course in abstract algebra. Almost any college mathematics course reinforces the manipulative skills of algebra, but the elucidation of the concepts is another matter; and the concepts should be clear in the mind of the teacher, no matter what the method and spirit of the ninth-grade course may be.

(3) Probability and statistics are among the most important applications of mathematics. In scattered schools, they are now taught in the twelfth grade; and this would probably be done more widely if the teachers were prepared for it.

(4) Tenth-grade geometry is in a rather peculiar position: the usual undergraduate courses throw rather little light on its fundamentals. (Courses in "advanced Euclidean geometry," for example, make a rather small contribution to this problem.) There is a good deal of debate on the question whether the tenth-grade student should be asked to have a thorough logical understanding of geometry. Some believe that the treatment of geometry should be largely intuitive. But in any case the *teacher* should have such a thorough logical understanding; and we believe that this requires a two-semester sequence. This should include material on the foundations of geometry (in the commonly understood sense of the term) but should go beyond this so as to elucidate not just the very beginnings of the subject, but the later material ordinarily taught in schools. It should include collateral material (for example, non-Euclidean geometry) which brings the elementary theory into sharper focus.

The program proposed above differs from the usual undergraduate major chiefly in two ways.

First, the stress on analysis is reduced; we have not recommended a course in advanced calculus or even a course in differential equations. This is because we believe that these courses are not sufficiently close to the high school curriculum to justify giving them high priority in a minimum program. (In fact, most junior-level courses in differential equations are devoted mainly to the study of techniques of calculation; conceptually, some of them actually represent retrogressions from the preceding calculus course.) We urge, however, that the elective courses include a course in advanced calculus, of a sort which would reinforce conceptual grasp of elementary calulus. Every high school teacher who is qualified to teach calculus is likely to be asked to do so, but the converse is lamentably false. In the specific recommendations above, analysis has been somewhat neglected, on the ground that various other topics deserve priority. But if calculus is thought of as part of a high school teacher's job, this neglect needs to be remedied.

All of the courses that we have described, with the possible exception of geometry and probability, are now commonly taught; and the latter two are not intended to be "trade school courses" in such a sense as to be foreign

bodies in a liberal arts curriculum. We believe that they should be taught, at least in alternate years, if enrollments and staff resources make them practicable. We believe, moreover, that a net increase in the number of courses offered can be avoided by dropping from the curriculum various courses now commonly taught but not really needed. For example, we do not need separate courses in trigonometry, the theory of equations, "advanced Euclidean geometry," or solid analytic geometry. The material that is really needed from these courses is included in the ones recommended in this report.

The preparation recommended here is rarely achieved by the present generation of high school teachers. Ideally, however, it should be regarded as minimal rather than maximal; and the student who completes it has by no means reached a point of diminishing returns. The demands made on high school teachers have increased very sharply in the last decade, and it seems very likely that they will increase further in the next. Already a few schools have reached a point at which their natural next step is to offer a *second year* of calculus at the end of accelerated programs. And in the great majority of schools it appears that the limits of student achievement are being set not by the students but by the staff.

It will be observed that we have not attempted to discuss the problems of preparing teachers for the junior high school. It is reasonable to suppose that the minimum preparation for this level could be less than for the senior high school; but the junior high school curriculum is now in such a rapid state of evolution that it is not plain to us just what the minimum might be. (For a recent discussion of this problem, see "Recommendations of the Mathematical Association of America for the Training of Teachers of Mathematics," *American Mathematical Monthly,* volume 67 (1960), pp. 1-10.)

Finally, we emphasize that our recommendations for prospective teachers do not depend, in any significant degree, on the merits of the various new high school mathematics curricula which have recently appeared. We believe that the sort of preparation we have described is needed for teaching *any* sound high school program. The teachers' knowledge should in any case be broad enough and deep enough so that curricular reformers in the next few decades will not face a prior problem in teacher-training.

N. C. Ankeny, Massachusetts Institute of Technology
John G. Kemeny, Dartmouth College
Edwin E. Moise, Harvard University
Cletus O. Oakley, Haverford College
Helen G. Russell, Wellesley College

NATURAL SCIENCES

Rapid advances in fundamental scientific knowledge and in the impact of scientific results on social affairs are putting increased responsibility upon science teachers at all levels, from the early grades through the university. The effects are particularly significant for secondary school teachers (grades 7-12) with whom most of our young people have nearly all of their study of sciences.

The young person of today, on reaching junior high school, has already begun an informal science education through instruction in the elementary school, as well as from popularly written articles, from television, and even from some of his toys. Subsequent instruction in the secondary school offers the opportunity to extend and guide interest through an introduction to scientific ways of working and thinking that will form a dependable, enlightened basis for his later contacts with the expanding influence of science on the life of everyone. If he goes no farther in his study of science, it should give him something dependable, although introductory, for his maturer intellectual life. If he does elect further scientific study, this beginning should be designed as a stimulating base for further study.

Apparently some students in the 10th, 11th, and 12th grades can learn more than previously believed. Many can handle reasoning that was earlier considered beyond their maturity and respond enthusiastically to the genuine intellectual challenge of scientific problems. In this connection it should be noted that colleges and universities are giving greater attention to the placement of students who have had advanced science courses in high school.

Scientists of today are making serious efforts toward a new era in science education. Scientific societies have directed, through the efforts of selected groups of teachers and professional scientists, the production of new textual materials, laboratory exercises, and films directed toward secondary school education. These materials emphasize science as an intellectual and exciting human activity. Special opportunities for summer study in advanced science work have been made available for secondary school teachers. Already these efforts are beginning to change the character and content of secondary school science teaching. The future teacher must be trained through college courses which have this new spirit and emphasis on dynamic science.

The science teacher has a responsibility for creating a program of active student inquiry. He must aid the student to make observations both in the world about him and in the laboratory. He should encourage the student to

develop an inquiring mind as to why thus and so happens or how it might be explained. He must provide stimulating opportunities for his students' synthesis of knowledge provided by field trips, laboratory experiments, reading and class discussions. He must teach his students how to think logically about scientific phenomena as a basis for sound judgments. He should be ready to encourage the independent projects of his more interested students. The teacher must inculcate in students a sense of strict honesty in gathering and interpreting data. Necessarily we expect the future teacher's undergraduate program of study to provide breadth and depth in his knowledge and training, which both directly and indirectly focuses upon his preparation for teaching.

The unity of the world and the growing interdependence of the classical subdivisions of science require that the academic background of the science teacher have breadth. The methods, concepts, and equipment of physics and chemistry are used by the biologist to probe the structure and functioning of cells and organisms. The chemist must use his knowledge of physics, and the physicist must use his of chemistry. Astronomy, geology, meteorology, and oceanography are linked as earth sciences, in which facts and concepts from physics, chemistry, or biology are frequently used. Mathematics, in addition to being studied for its own value, is needed as a tool for evaluation in all sciences. New information, new perspectives, new methods of approach all call for a broad background of study in the sciences. In addition, the prospective teacher needs the self-confidence and competence that result from study in depth of one phase of science. Thus we conclude, as have the several committees of the American Association for the Advancement of Science (1946, 1960), that approximately one-half of the course work in college of a future science teacher should be concerned with science and mathematics.

Of central importance is our belief that as a result of his total collegiate study the secondary school science teacher must be capable of co tinued scholarly growth. Therefore, we believe that independent study of a problem is desirable to put the student "on his own." Such an investigation may open whole new areas of study for the student and extend a growing knowledge of the general field and an awareness of the methods used by scientists.

If the science teacher is to hold the respect of his colleagues, his students and the community, he should have a cultural background including training in English, the arts, languages, and social sciences.

A successful science teacher must give to his work a genuine enthusiasm and zest that carries over to his students. He must feel and exhibit the stimulation of learning, of interrelating ideas, the excitements of provoking new discoveries by the pupils, and the pleasure of creating in them the fascination that he finds in a subject. These assets stem both from his own personality and from the perspectives of his scientific background. Supporting them, however, there

must be the steadiness and security that come from good professional training including practice teaching.

Since practice teaching and other educational requirements must obviously be met, a nice fit is required in the planning of a program which shall satisfactorily embody the aims of breadth, depth, and professional experience. While a four-year program can be devised, five years is desirable to develop a beginner who is an apt apprentice.

The prospective teacher is entering a respected and very important career. Many opportunities exist for increasing responsibilities for those who wish them. Successful teachers gain satisfaction from helping younger students to learn of the world and to become responsible for their own interpretations of phenomena. Student interest in our subjects, possibly to the extent of choosing a career in their further study or teaching, is very gratifying. A teacher has the opportunity to continue being a student and interpreter of the exciting exploration of the world. Also, continuing contact with those extending the forefront of knowledge adds to the joys of being a teacher. To us, serving as science teachers is a rewarding life of great social importance.

General Recommendations

1. To meet satisfactorily the prospective secondary school teacher's need for breadth and depth of subject matter, as well as for professional experience, the fifth year of study, i.e., one year beyond the baccalaureate degree, is highly desirable, in fact almost a necessity.

2. In solving the dilemma of choice among breadth, depth, and professional experience, much of this last may best be left for the fifth year. In many undergraduate programs little time and supervision is available for practice teaching and postponement of this experience until after the acquisition of a good deal of knowledge may have a distinct advantage.

3. As academic distinctions become less sharply defined, the required areas of study are not usefully spelled out in terms of specific courses and hours. It is more important that the future teacher gain an understanding of the nature or structure of the subjects to be taught and an appropriate attitude toward them. It is strongly recommended that this be planned for in each of the areas of study by obtaining training, whenever possible, with specialists who are actively interested in research and who are themselves good teachers. This may serve as a guard against teaching students later a mass of unrelated facts which are to be memorized and, upon command, regurgitated.

4. Between one-third and one-half of the undergraduate program should, if possible, be arranged with respect to the student's eventual plan for teaching. Ordinarily one year of beginning study in each major field—chemistry, physics, biology, and mathematics—is essential for the teacher of natural sciences. Furthermore, it is highly desirable that these introductory courses be taken

as part of the undergraduate program. Geology, astronomy, and meteorology are also potentially rich resources for any teaching, and especially for teaching general science or the earth sciences. Here we are faced with a persistent problem in designing programs for future science teachers: how much breadth and how much depth? There is no precise answer. We recognize the need for breadth of introductory study in several sciences as a basis which further study and reading can extend. Yet we acknowledge the competence and confidence that result from study of one science to some depth. Ordinarily the student can achieve some breadth as well as some depth; we warn against excesses of either breadth or depth.

5. The allied work required as support for the major should include more than one of the related sciences—as, for example, chemistry and physics for the biology major. Whatever the major, we emphasize the great value of experience with an independent laboratory problem.

6. The undergraduate program recommended here is one that demands early planning if the fifth year is to be used effectively. Many liberal arts students who take the fifth year of preparation for teaching do not decide to do so until they are juniors or seniors; for them some compromises or additional study may be necessary. It is therefore recommended that students who have any possible interest in teaching secondary school science be encouraged to consult with their advisers while they are still freshmen and sophomores.

7. The importance of mathematics for future teachers in any of the various fields of science is emphasized. A year of calculus is recommended, and also a half year of statistics especially designed for science students, if possible.

8. Summer study at institutions with a specialized scientific focus is highly recommended for the future teacher. For example: for the biologist, there are positions in hospitals and biological industries, as well as marine and inland summer laboratories; for the physical scientist, there are positions in various government, university and industrial laboratories, or with field expeditions. By such experience, horizons are expanded for research, and wider intellectual contacts are made.

9. Prospective teachers will be wise to begin during their undergraduate program to make a card file on the sources of various teaching materials, films, sourcebooks, identification keys, etc. A teacher can never know of too many such sources.

10. Some study of the history and philosophy of science in the preparation of the prospective teachers is desirable, but such courses will be more significant when taken after previous study of the science. Incidental reading, perhaps during the summers, would also be helpful in filling what is often a serious gap in the knowledge of the prospective teacher of the development of scientific ideas, their rationale, and their impact upon the thought and behavior of individuals and groups.

Additional Recommendations for Preparation in Earth Sciences

The earth sciences, here considered as geology, astronomy, meteorology, and oceanography, provide splendid opportunity to arouse an interest in science. Through them students can learn to observe and to question as a means of increasing their knowledge; to visualize things in three dimensions, with the aid of models and then in imagination; and to work with abstractions.

For the prospective teacher of the earth sciences, the college program should include, as a *minimum,* a year course in either astronomy or geology. We do not consider a semester of astronomy and a semester of geology as adequate. Study in meteorology or oceanography is desirable, if such courses are available. In addition, the prospective teacher should read widely and, if possible, hear a series of lectures by experts actively engaged in research in the various earth sciences, if necessary through the use of tapes, films, or television. A major in geology or astronomy with some study in other aspects of the earth sciences is one practical program for a future science teacher.

Since meteorology unfortunately is taught in only a limited number of colleges, and oceanography in even fewer, it is recommended that there be available for tomorrow's science teachers a generous reading list covering the two fields, revised frequently and listing books which present the fundamentals clearly. This would emphasize the effective use of libraries to the ultimate benefit not only of the prospective teacher but also of his students.

Additional Recommendations for Preparation in the Physical Sciences

Unless a more radical change than we can foresee takes place, the typical physics teacher, like most other science teachers, will find it necessary in the future, as he has in the past, to teach one or more other subjects. If about six per cent of the high school population is taking physics in any given year, and we hopefully envisage fewer and smaller sections per teacher than are now customary, a full load of four physics sections of twenty-five students each would be available for a teacher only in a school with more than 1700 students.

We therefore do not believe that we should necessarily expect every prospective physics teacher to complete an undergraduate major in physics. We do believe that adequate preparation can be given in a five-year program if the student majors in physics or chemistry or mathematics. In such a case two years each of physics, chemistry, and mathematics, two additional years of advanced courses as part of a major in one of these fields, and a year of biology or geology should be completed by the end of the fifth year.

Additional Recommendations for Preparation in Chemistry

Beyond the informational content of a college course in chemistry there

is its greater value in developing in students an appreciation of its theoretical basis, its evolutionary character, and its value as a cultural discipline. A realistic four-year course of training for secondary school chemistry teachers should be built around a minimal chemistry major (general, analytical, organic, and physical) with the inclusion of as much physics (and the necessary mathematical background) and other science courses as can be accommodated to the general liberal arts requirements and the Education courses needed for certification. The fifth year should then be devoted to further courses in chemistry and other sciences, or in part to Education and practice teaching if these requirements have not already been satisfied.

Additional Recommendations for Preparation in Biology

With the inevitable changes that are coming into high school biology teaching, the teacher must do his part to develop young people's understanding of the living world around them. He must know as many plants and animals in the field as possible, and he must understand how to go about their identification. He must also know how to grow and experiment with microorganisms for their usefulness in short-term experiments. He must know how to use a microscope with ease, and how to study the cellular anatomy of plants and animals. He must have grasped the significance of what we currently know of genetics and its all-pervasive importance. He should be able to recognize the dynamic aspects of living matter by functional studies on plants and animals, and he should study human physiology for its place in physiological thought, rather than solely as a basis for exhortations in hygiene. Most important of all he must have developed a "feel" for the changes that are always going on in living organisms, some in response to changes in the environment, some resulting from internal regulation of growth and metabolism.

The biology teacher will need to study physics and chemistry (including organic) not only for their theoretical value but also for their practical help in the use of simple apparatus, the making of solutions, and the performance of chemical tests. Without the concepts of biochemistry and biophysics he will be unable to understand and appreciate the significance of developments in molecular biology.

Furthermore, the secondary school teacher of biology should have gained through his reading or courses an understanding of the economic, social, and political implications of today's knowledge of the biological sciences in areas of human concern such as world food supplies, population increases, radiation hazards, space travel, and problems of health and disease. In short, secondary

school biology should provide a sound basis for an appreciation of the role of the life sciences in all aspects of human life.

Gordon S. Christiansen, Connecticut College
Harriet S. Creighton, Wellesley College
Charlotte Haywood, Mt. Holyoke College
L. Don Leet, Harvard University
Walter C. Michels, Bryn Mawr College
Charles H. Smiley, Brown University
Fletcher G. Watson, Harvard University

HISTORY AND THE SOCIAL SCIENCES

Although its mandate is to make recommendations for the specific subject-matter appropriate to the training of social studies teachers, the committee feels it is important to make clear at the outset its reaffirmation of the desirability of a broad liberal arts education. Though it cannot be denied that mastery of the subject field is essential to successful teaching, it is equally true that the acquisition of skill in critical thought and an appreciation of the variety of the human experience are also needed. This is especially so for work in the social studies, where the curriculum has become, all too frequently, doctrinaire, and either superficially descriptive or over-generalized. These tendencies can be counteracted whether in the teaching of existing courses or in the revision of the curriculum only by teachers who have had a broad and rigorous intellectual training. It is assumed, therefore, that every prospective teacher will have at least a basic acquaintance with the natural sciences, mathematics, philosophy, foreign language, literature, and the fine arts. The committee has deliberately kept the amount of study recommended in the social sciences down to a level which would make that possible.

Furthermore, the committee also feels it is necessary to emphasize that general intellectual ability is no less desirable a trait in a teacher than is knowledge of particular subject-matter. Thus, it has strived to avoid a rigid prescription of undergraduate training lest it thereby preclude an intellectually capable student from seeking the Master of Arts in Teaching or another, similar degree merely because he has not taken the required courses. Such an approach is justifiable also for the sake of preserving the diversity inherent in the facts that candidates come to Master of Arts in Teaching Programs with differing subject-matter backgrounds and may elect a great variety of courses during their graduate year. Again, however, it must be said that sound knowledge of the subject field is also requisite to effective teaching. The inference is that, where an intellectually able student with limited training in the social sciences is accepted for Master of Arts in Teaching candidacy, extra study may be required of him.

For these reasons, the committee has defined its task to be the recommendation from among the varied offerings of the Twenty-nine Colleges and a university such as Harvard of a pattern of courses which the Master of Arts in Teaching candidate should elect *over his five-year period of training* in order to prepare himself for the role of a secondary school social studies teacher, assuming either the continuance of the existing curriculum or his participation in its reform and improvement.

With these points in mind, then, the committee's specific recommendations for the subject-matter training of the prospective teacher are as follows.

Within the five years encompassed by undergraduate study and the year of graduate work, social science M.A.T. candidates should have fufilled these requirements as a basic minimum:

(1) They should have had 3 full courses (one-year courses or their equivalents) in history including introductory courses, one of which should be in United States History.

(2) They should have had 3 full courses (one-year courses or their equivalents) divided between 2 social sciences other than history (anthropology, economics, political science, sociology, human geography).[1]

(3) They should have acquired thorough grounding in the ideas and institutions of an area other than the United States and western Europe—either as part of recommendations (1) and (2) or in addition to them.

(4) They should have written one or more research papers on an historical or social science problem.

Each of these recommendations deserve further elaboration and more specific connection to the committee's basic assumptions.

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[1] Though the majority of the committee did not agree, Professor Feldmesser contends that psychology is a social science which is fully as relevant as anthropology, economics, political science, sociology, and human geography and should therefore have equal standing with them in this recommendation. Professor Pennock wished to record the following dissent: "In view of the fact that, according to the information supplied to the committee, the prevailing pattern of secondary school requirements includes study of American government, community civics, and problems of democracy during the eighth, ninth, eleventh and twelfth grades, it appears to me that we should recommend specific training directed toward the teaching of these courses as we have in the case of American history and the study of non-western cultures. The fact that the work in these high school courses is notoriously often at a rather superficial level provides further justification for such a requirement. My personal recommendation then, would be that the social science requirement should include at least one-half course designed to give some sophistication in the theory and practice of politics, and to combat the formalistic and purely descriptive mode of instruction that so often prevails in the high school courses in this subject."

1. *The History Requirement*

Any decision about subject-matter preparation of a teacher depends in part on knowledge of the courses he will be required to teach. We are here concerned with the "fifth-year" graduate who takes a position as a social studies teacher in a junior or senior high school. Although there exists no careful study of the instructional duties of such a position, the committee felt it possessed sufficient evidence[2] to warrant making the following generalizations: (1) American history is the subject most frequently taught by social studies teachers in both the junior and senior high schools. This will likely continue to be so in the predictable future since laws in 46 states require courses in American history in the senior high school and many of them prescribe it in the junior high school as well. (2) The obligations in content fields other than American history are difficult to predict because of the large number of different topics encompassed in the "social studies." In the high school, a survey course in World History, though increasingly offered on an elective basis, is second in frequency to American history, followed by courses in "Problems of Democracy." Many high schools also offer elective courses in special areas of history (e.g., Far Eastern History, Latin American History) and in sociology, economics, and American government where the staff includes a faculty member able to teach such courses. The law of one state (Pennsylvania) now prescribes a course in world cultures as a requisite for a high school diploma and it is possible that this type of course will become popular as an alternative to world history. In the junior high school, content is even more variable than in the senior high, with a tendency to offer "fused" courses in "social studies," "correlated courses" in English and social studies, and courses in "community civics." (3) Most "fifth-year" graduates teaching in senior high school are required to teach in two related content areas. (4) Graduates are normally required to teach students of all levels of ability, but the majority of their pupils are in the average and above-average categories. Some, however, are given the opportunity to instruct the "advanced placement" classes in the senior high school after they have had a few years of classroom experience.

Thus history's dominance of the secondary school curriculum as well as its position as a major social science demand its study by the prospective social studies teacher. Since it is certain that nearly all Master of Arts in Teaching graduates who remain in classroom teaching more than a few years after receiving the degree will be asked to teach content from the area of American history, knowledge at least equivalent to that available in a college survey course in United States history should be obtained by all candidates.

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[2] The committee had available data from U.S. Office of Education surveys and a survey made by Professor Bolster.

Moreover, there is distressingly frequent evidence that American history teachers are being forced to defend their teaching against attacks by pressure groups, whose goal is to use the social studies curriculum as a propagandizing agent for super-patriotic, ultra-conservative political and economic views. It seems axiomatic to the committee that the teacher's best defense against such attack is the kind of thorough knowledge of the American past available in rigorous, analytic courses.

For a number of reasons specific requirements beyond United States history are difficult to define. Adequate preparation of junior high school teachers, for example, is complicated by the existence of the "English-social studies combination" which purports to combine content from these two areas. Frequently novice teachers whose subject matter background is chiefly in history are assigned to such courses in their apprenticeship or offered positions teaching them upon graduation. In such cases it is essential that history training be supplemented by instruction in language arts, with special emphasis on the teaching of composition.

Another difficulty is presented by the unsatisfactory nature of the world history offering in the high school. In its present form this course faces the teacher with the immense problem of surveying within a single academic year sufficient portions of the total recorded human past to enable the high school sophomore to comprehend the historical development of the significant nations and problems of the contemporary world. Such a task is patently impossible, and in his attempt to cope with it the teacher all too frequently doles out large collections of half-true, half-understood generalizations to students who thereby come to dislike history. The most promising means of improving this unfortunate situation seems to lie in a much more rigorous selection of content than is now practiced. This will require much thought to develop intellectually sound criteria according to which the selection may be made. The committee wishes to encourage the small number of high schools which are attempting this type of reform, but it also believes that the presently typical history course will remain prominent for several more years. Its recommendations thus seek both to prepare new teachers to participate in the much-needed revision of this course as well as to cope more adequately with an inherently objectionable situation.

With the foregoing considerations in mind, then, the committee proposes the following generalizations as guides to the selection of history courses: (1) Introductory courses should be taken in undergraduate college since they are closed to graduate students in many fifth-year programs. (2) The canons of general education as well as the nature of the secondary school curriculum make it mandatory for students concentrating in some form of American studies to take also at least a basic course in European history or culture. (3) Depth of study in some specialized area of history (e.g., Amer-

ican, modern European) is highly desirable to develop some acquaintance with the more complex materials of the discipline. This recommendation is also warranted by a growing tendency for high school history courses for advanced students to include within their scope detailed analysis of historical problems. (4) Both American and European history majors should consider taking courses as they are available in the history of Latin America, Africa, the Near East, India or the Far East as a means of fulfilling the recommendation to study an area beyond western Europe and the United States.

2. *The Requirement in the Other Social Sciences*

Although the social sciences other than history have had relatively little significant impact upon the secondary school curriculum, there are a number of reasons why considerable knowledge in at least one of them should be required of all prospective social studies teachers. Both their methodology and their concepts are increasingly valued throughout the world as an aid in more adequately understanding human society; indeed they are even being increasingly applied to the writing of history.[3] Moreover, the social sciences have become basic to the advanced study of education and they are being relied upon as aids in the making of both public and private decisions.[4] Finally, they are themselves likely to be taught more often in the future as part of the high school social studies curriculum.

In regard to the social science requirement, the committee recommends that the following standards should apply: (1) To provide breadth, introductory courses in more than one area of social science are recommended and these too should be taken in undergraduate college. (2) Beyond the introductory level specialized concentration in one area of social science is desirable as a means of providing acquaintance with the methodology and some of the advanced thinking of the social scientist. At the same time the prospective secondary school teacher should recognize that highly technical courses are not especially relevant to his training since he is aiming to develop not the refined tools of the research scholar, but rather helpful insights into the nature of human society. (Highly technical courses appear to the committee to be prevalent in the field of economics, though they exist in other behavioral sciences as well.) (3) Courses in social science, especially those in cultural anthropology, provide a possible means of fulfilling the recommendation regarding the study of an area outside the United States and western Europe.

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[3] Cf. H. Stuart Hughes, "The Historian and the Social Scientist" *American Historical Review* LXVI, No. 1, October 1960.

[4] Cf. for an explication of this idea Daniel Lerner (ed.), *The Human Meaning of the Social Sciences* (New York, 1959).

3. *The Requirement for Study of an Area Outside Western Europe and the United States.*

The rationale for this recommendation rests heavily on the committee's conviction that there is far too much parochialism in American popular thought. Though broad perspective and tolerance would seem implicit in the very concept of "liberal education," there is considerable evidence that graduates of both secondary schools and colleges in the United States in fact frequently have an essentially naive and limited image of the world. Careful study would be required to ascertain the exact relationship between the parochial viewpoint and the content of formal education, but it seems reasonable to predict that social science training which emphasizes the western tradition exclusively would reinforce a culture-bound outlook. For this reason the tendency of Master of Arts in Teaching candidates to concentrate their content preparation overwhelmingly in western history should be resisted.[5] The same course of action is also justified as a response to recent agitation for state laws requiring courses in the nature of world communism. Since there is good reason to suspect that they are frequently sponsored by ultra-conservative forces, they are likely to consist solely of propaganda unless those who write and teach them have at least sufficient content background to organize comprehensive and analytic studies. For this purpose collegiate study of the world beyond western Europe and the United States, particularly of the history and society of Russia, would be advantageous.

Finally, aside from its intrinsic rewards, which can be immense, exposure to a non-western culture is one of the best means of gaining perspective on United States history. The increasing need of the teacher of United States history will be to define American values and history in the larger context of America's relations with her European past and her non-western neighbors. The study of American foreign policy will alone demand great breadth and depth of understanding, knowledge, and insight. Here, Islamic, Indian, and Far Eastern studies all have the advantage of introducing the student to culture worlds of vast importance and to more adequate comprehension of policy problems in our contemporary society.

4. *The Research Paper Requirement*

The committee accepts as given the proposition that adequate teaching of the social studies requires familiarity not only with their significant data

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[5] An informal survey of the 1961-1962 group of social science M.A.T. candidates at Harvard has revealed that as a group they have taken in undergraduate college a total of 1,959 full courses in western history and only 7½ courses in non-western civilization.

and generalizations but also with the methodologies according to which they operate. The argument favoring the encouragement of critical thought in the curricula of all schools is so obviously applicable that it does not need reiteration here. What does warrant further consideration is the proposition that, though related, the methodologies of the historian and the social scientist are different and that the nature of these methodologies affects the content of these disciplines in ways with which the teacher should be familiar. Consideration of these topics would be of value to the prospective social studies teacher not only as an aid to understanding the content he will teach, but also as a means for facilitating sharp thinking. While formal courses in historiography and philosophy, particularly those covering the nature of the scientific method, are highly desirable, the first-hand experience of grappling with some social science problem requiring substantial research according to the canons of a social science discipline is even more valuable. No matter what its form or length, a suitable study would necessarily involve a rigorous analysis of a problem, the rational defense of a solution to it, and scrupulous attention to excellence and skill in expression and communication. In the committee's opinion it is more important to emphasize these objectives than to prescribe whether such a paper be written within or outside the requirements of a course.

It should be understood that the committee's proposals are to be construed as minimal. They describe the beginning and not the end of competence in the social sciences, and no teacher possessed only of the knowledge they demand is likely to be truly superior. Obviously then, prospective teachers who can arrange their programs in such a way as to build substantially on these foundations while still in college should be encouraged to do so. For clearly an important assumption on which the social science committee operated is one of the basic premises of most Master of Arts in Teaching programs themselves: depth of knowledge of subject is an indispensable element of outstanding teaching.

Arthur S. Bolster, Jr., Harvard University
Robert Feldmesser, Brandeis University
Frank Freidel, Harvard University
Edward V. Gulick, Wellesley College
Edward C. Kirkland, Bowdoin College
J. Roland Pennock, Swarthmore College
George R. Taylor, Amherst College
Benjamin Ziegler, Amherst College

TWENTY-NINE COLLEGE REPRESENTATIVES

1961 - 1962

Amherst	Professor Robert F. Grose
Barnard	Professor Helen Bailey
Bates	Professor Raymond Kendall
Bennington	Mrs. Margaret DeGrey
Bowdoin	Professor Paul Hazelton
Brandeis	Professor Merrill D. Peterson
Brown	Professor A. David Kossoff
Bryn Mawr	Dean Dorothy N. Marshall
Colby	Professor Norman S. Smith
Colgate	Professor Raymond Rockwood
Connecticut	Dean Gertrude E. Noyes
Dartmouth	Professor Ralph A. Burns
Hamilton	Professor Franklin Hunt
Harvard	Dean John Monro
Haverford	Professor Harmon C. Dunathan
Holy Cross	Reverend John Long
Lafayette	Professor Fred V. Roeder
M.I.T.	Professor Robert E. MacMaster
Middlebury	Professor Donald A. Campbell
Mount Holyoke	Professor John C. Osgood
Pembroke	Miss Katharine Irwin
Radcliffe	Dean Kathleen Elliott
Sarah Lawrence	Mrs. Jane Judge
Simmons	Professor Harold Hodgkinson
Smith	Professor Charles E. Peterson, Jr.
Swarthmore	Vice-President Joseph B. Shane
Vassar	Associate Dean Evalyn A. Clark
Wellesley	Professor Mary Ulich
Wheaton	Dean Elizabeth S. May
Williams	Professor Harlan Hanson